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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE MAY 1, 1948



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A SCIENCE SERVICE PUBLICATION

PHYSICS-PHYSIOLOGY

Danger of Unheard Noise

Assessment of the extent of possible bodily damage from airborne ultrasonics must be made. Scientist warns against wild rumors which might hamper progress.

► THE danger to pilots from unheard noise and vibrations of faster-than-sound planes are matters of "grave concern," Dr. Hallowell Davis, director of research at the Central Institute for the Deaf, St. Louis, warned at the meeting in Washington of the Acoustical Society of America.

Dr. Davis warned at the same time against rumors, "weird stories" and "wild observations" of damage from sound that the human ear can't hear. These can arouse public fear, he charged, and seriously hamper progress.

It is possible, for example, that ultrasonic sound encountered in jet or turbo-jet planes could burst the blood vessels in the brain without any warning discomfort or pain. But there is no proof of such danger, he stated.

Small animals, he stated, may be literally cooked to death by the heating caused by high-intensity ultrasonics. But this does not happen without warning. Their sense organs give them correct information as to the immediate situation, through the heating of their fur, though they do not know the cause of the danger.

Injuries to the lungs reported as resulting from "blast" from explosions and from sustained very high intensity sound are examples, Dr. Davis said, of supersonic damage to bodily structures.

Disruption of the wings of insects is another example of ultrasonic damage.

The energy of inaudible sound can cause chemical and colloidal effects such as underlie the killing of bacteria, the aging of whisky and the homogenization of milk. These effects may also be produced in the human body. But these possibilities, Dr. Davis said, have not yet been assessed. Man may be protected from any such effects from airborne ultrasonics by their effective reflection from his skin.

Both the discomfort threshold and the danger zone for man for the sound frequency spectrum up to at least 200,000 cycles per second need to be determined, Dr. Davis said. Engineers need this information for the safe design of high-performance aircraft and other mechanisms that produce high-intensity vibratory energy.

Ultrasonic sound is the kind of vibration that the human ear can not hear. It is the range of vibration between 15,000 and 500,000,000 cycles per second. Supersonics is sometimes the name given to such high-rate vibrations, but due to the increase in speeds beyond the speed of sound (about 760 miles per hour) the term supersonics is now being applied to those speeds rather than the high rate of sound vibrations, which are called ultrasonics.

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CHEMISTRY

Secret of Gasoline Jelly

► THE war-time secret of what makes gasoline thicken into a jelly for use as a liquid incendiary in flame-throwers or fire bombs was revealed.

It is a soap made with aluminum instead of the usual chemicals used in ordinary soap, Dr. Walter H. C. Rueggeberg of the Army Chemical Center, Edgewood, Md., told the American Chemical Society meeting in Chicago.

Existence of jellied or thickened gasoline was known during the war, particularly in the Pacific and especially to the Japs in dug-outs who learned the hard, flaming-hot way. But it was not told just how the scientists thickened the fuel

and made it so jelly-like that it stuck to things it was thrown against.

Aluminum soap thickeners consist of three kinds of chemicals: 1. an aluminum salt of the soap-forming saturated, fatty acids. 2. an unsaturated soap-forming fatty acid. 3. naphthenic acid. These are used separately or as a mixture. Napalm, one of the most successful of the incendiary gels, is an aluminum soap of an oleic, naphthenic and coconut fatty acid mixture.

These aluminum soaps have interesting and unusual properties that no other similar group of compounds possess. They become thick and viscous when

shaken. They make the gasoline "set" when mixed with it. Chemists call this property "thixotropic."

Under cloak of post-war secrecy, it is known that experiments are being pushed vigorously to make even thicker and more solid gasoline so that fuel can be stored and handled somewhat like a solid instead of a liquid. This present military research is probably based on the war-time successes, although it was not discussed at the meeting.

Dr. Rueggeberg did make known that natural and synthetic rubbers as well as plastic resins such as the polyacrylates can be used as fuel thickeners. These produce jellies that are somewhat different from the soap-thickened fuels.

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CHEMISTRY

Whisky of the Future Can Be Made from Wood

► WHISKY of the future can be made from wood, instead of being merely aged in the wood. Science is ready to substitute sawdust for grain in ethyl alcohol manufacture and save huge quantities of wheat, corn and other grain for feeding a hungry world. Only federal regulations prevent this from happening now.

Dr. Robert S. Aries of the Brooklyn Polytechnic Institute told the American Chemical Society meeting in Chicago that a \$3,000,000 alcohol plant already built could produce 10,000,000 gallons or enough to make over 25,000,000 gallons of whisky. A ton of sawdust now wasted can yield about 50 gallons of drinkable alcohol.

Natural gas and petroleum refinery wastes can also be made into alcohol as good as grain alcohol, Dr. Aries claimed. The cost of alcohol from wood waste is a third of that from grain and the synthetic alcohol from oil and gas costs even less.

The drinker might not be able to tell the difference, Dr. Aries said. Slogans such as "Made from wood, aged in the wood" might win public approval for the new kind of whisky.

If the regulations of the Treasury Department controlling liquor manufacture were changed, the labels on the bottles might read "sawdust neutral spirits" and "petroleum neutral spirits" where they now read "grain neutral spirits."

The more than 10,000,000 tons of sawdust wasted annually could supply more than three times the demand for whisky. Every ton turned into alcohol would replace 20 bushels of corn or wheat.

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MEDICINE

Cobalt for Cancer Tested

This radioactive material is being tested at four institutions to determine standard dose for treatment. Will be a cheap and plentiful substitute for radium.

► TESTING of radioactive cobalt from the atomic pile for treatment of cancer patients is now under way at four institutions.

This is the material which Chairman David E. Lilienthal of the Atomic Energy Committee told President Truman could become a cheap and plentiful substitute for costly radium now used in cancer treatment.

The four institutions where the new material is being tested are: Ohio State University, at Columbus, Ohio; Memorial Hospital in New York; the University of California at San Francisco and Washington University at St. Louis.

Cancer patients generally may not get radioactive cobalt treatment for some little time. This is not because of any production bottleneck. It is because the dose has to be standardized. This is a job for experts and is what is now being done. But it may take two or three years or even longer, A.E.C. officials said. They pointed out that it took 25 to 30 years for standardization of radium dosage.

The material will cost only about a tenth of what radium costs, it appears from comparison of present prices. A.E.C. list price for one unit of radioactive cobalt is \$33 f.o.b. Oak Ridge, Tenn. To this must be added a \$25 handling charge, made on all shipments of radioactive material from Oak Ridge, and the shipping charges on the unit in its 200-pound lead container. The total would probably come to between \$60 and \$75. The cost of an equivalent amount of radium, on a dosage basis, would be \$500. To this must be added insurance, which is very costly on radium, and handling and packing charges. Radium, because of the radon gas which emanates from it, involves a more difficult handling problem.

Smaller hospitals usually borrow or rent their radium from larger institutions, because it is so scarce and costly they cannot afford to own any. Some larger centers have theirs on loan from the National Cancer Institute of the U.S. Public Health Service.

Radioactive cobalt would be used in needles or tubes in the same way that radium is used for cancer treatment. It

cannot be used in a colloidal form, as radioactive gold is now being used, because it has too long a half life. Its half life is 5.3 years. An advantage of the colloidal form in which radioactive gold is being used is that not only gamma radiation but also beta radiation from

MEDICINE

New "Blue Baby" Disease

► SANITATION chemists were alerted to the hazard of a new "blue baby" disease that comes from nitrates in drinking water.

The disease may be confused with congenital heart disease, which also produces "blue babies," but it is not the same condition, James G. Weart, sanitary engineer of the Illinois Department of Public Health, explains in his report to the American Chemical Society meeting in Chicago.

Infant methemoglobinemia is the name of the blue baby disease that comes from too much nitrate in drinking water. The disease is apparently limited to babies under six months of age.

In Illinois alone 33 cases of the disease with five deaths have been reported in the past year. Cases are being reported with increasing frequency in Iowa, Kansas, Oklahoma, Texas, Nebraska, Missouri, Minnesota and Michigan as well as Canada and Belgium.

The disease may also exist in the richer agricultural areas of Europe and Asia, where soil and water conditions would favor its development. The role of water in causing the disease has only been known since 1945, so more cases may be reported as physicians become familiar with the symptoms.

Babies usually recover swiftly if a satisfactory water is substituted for the high-nitrate water in their formulas and drinking water. But in countless rural homes no other source of water is available and there is no practical way of removing the nitrate from the water. For this reason Illinois doctors have been advised not to prescribe feeding formulas involving water unless the nitrate content of the water is known to be within

many billions of point sources are utilized to bombard the cancer.

Commenting on the development of radioactive cobalt for cancer treatment, Dr. Leonard Scheele, director of the National Cancer Institute until his appointment this month as Surgeon General of the U. S. Public Health Service, said:

"If radioactive cobalt proves to be an entirely effective substitute for radium in the treatment of cancer patients, and we have reason to believe this will be so, it will afford welcome relief to hospitals and medical centers throughout the country."

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safe limits. A maximum safe limit of 10 parts of nitrate nitrogen per million parts of water has been set.



PLANT TISSUES GROW IN CULTURE—Masses of undifferentiated plant tissue can be grown from just a few cells each, taken from tumorous growths on plants known as crown galls. Those shown here were produced from a crown gall of a periwinkle plant, supplied with a nutrient mixture of accurately known chemical composition, in the plant pathology laboratories of the University of Wisconsin, by Prof. A. J. Riker, Mrs. Alice Butsche and A. C. Hildebrandt. They were shown before the recent meeting in Madison of the American Association of Anatomists.

The poisonous effect of the high nitrate water results, Mr. Weart explained, from the conversion of the nitrate into nitrite by bacterial action in the intestine. When absorbed into the blood the nitrite changes part of the hemoglobin, the oxygen-carrying chemical that makes blood red, into methemoglobin. This is an inert chemical that does not transport oxygen to the tissues. The blood becomes chocolate colored and the skin turns slate gray. Although the baby's appearance is alarming, its breathing and circulation may be relatively normal. But if the acute cyanosis persists

general damage and death may occur.

Besides changing the drinking water, treatment of the baby with either a blue dye, methylene blue, or with vitamin C, is said to bring dramatically prompt recovery.

One reason only infants seem susceptible to the ailment is that they have much less functioning hemoglobin than adults. The effect on older babies and children of continuing to take large amounts of nitrates is not positively known, but it may deplete them of vitamin C. Lack of this vitamin results in scurvy.

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CHEMISTRY

New Food-Saving Varnish

► THE world's first completely synthetic varnish, made from petroleum, promises to add to the world's food supplies by replacing paints and varnishes now made from edible vegetable oils.

The new type varnish prepared from a new petroleum chemical, glycerol allyl ether, was announced to the American Chemical Society meeting in Chicago by chemists from the Shell Development Company, Emeryville, Calif.

Insoluble films, hard to hurt with chemicals and resistant to scratching, are formed by the new varnish. It is made in several chemical steps from propylene gas, which is abundantly available from cracking oil.

Manufacturers are expected to apply the new varnish where they now use resins made from a combination of synthetic materials and scarce natural drying oils.

Linseed oil, soybean oil and cottonseed oil, which can be used as food, have been used as major ingredients up to now of so-called synthetic paints and varnishes. The new varnish is one of several attempts to replace some of the scarce vegetable oils with synthetic products made from more available non-food materials, such as crude oil.

H. Dannenberg, T. F. Bradley and T. W. Evans were the Shell chemists who did the research.

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ENGINEERING

Need for Coal Stressed

► MORE coal from American mines will be needed and the amount will rapidly increase during the next decade, the American Mining Congress was told at its meeting in Cincinnati by Dr. John I. Yellott of the Locomotive Development Committee, Baltimore. The reasons, he stated, are a deficiency of fluid fuels, large coal exports, and the interchangeability from a chemical standpoint of coal, oil and gas.

The major increases in the nation's fuel requirements must be met in some manner from coal, he declared, because the fluid fuels are rapidly approaching the point where their use will be restricted to applications, particularly automotive, to which coal is inherently unsuited, and for which fluid fuels are virtually essential.

Industrial activities are increasing, and

new housing is needed for a growing population. These new demands can not be met by oil or gas, and they must be satisfied by and with coal. Industrial and institutional coal customers can be retained, however, only by improvement both in equipment and in coal quality.

A coal-burning gas-turbine locomotive, now designed after three years of experimental work, was described by Dr. Yellott as one of the improved methods of using coal with a high degree of efficiency. Very finely powdered coal, pulverized on the locomotive, is forced into the combustion chamber mixed with compressed air. It is burned in suspension within an air-cooled combustor, and the heated gases, with fly ash removed, will run the gas turbine, which in turn will drive electric generators.

The coal-fired gas turbine will have

a wide field of use in stationary plants as well as in locomotives, he declared. The gas turbine is the first power plant which can exceed 25% in thermal efficiency without using a drop of water. An immediate application will be in supplying power for coal mines, which must now purchase power because they have no water for boilers and condensers. The gas turbine will free the power engineer from bondage to the boiler, and it will enable him to locate his power plant where he wants it, rather than near a water supply.

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One birth in 89 results in twins, one in 8,846 in triplets, and one in 599,921 gives America new quadruplets.

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ASTRONOMY

Eclipse Expedition Ready

Two months of testing equipment preceded the undertaking. Will offer rare opportunity to gather additional information on the shape of the earth.

By DR. LYMAN J. BRIGGS

Chairman, Committee on Research,
National Geographic Society

Written especially for Science Service

► SCIENTISTS awaiting the annular eclipse of the sun on May 8-9 are confident that, weather permitting, observations will go off as scheduled.

All equipment to be used by members of the multiple eclipse expedition, sponsored by the National Geographic Society, was put through its paces for two months before being shipped to observation points from Burma to the Aleutians.

Seven cameras to be used at various land stations along the eclipse path, together with radio and other equipment, were first carefully tested for many weeks by technicians at the National Bureau of Standards. Then the astronomers and geodesists responsible for their smooth operation at eclipse-time were brought to Washington for final tests.

Central Line of Eclipse

The central line of this solar eclipse starts in the Indian Ocean. Following the west coast of the Pacific Ocean, it extends as far as the Aleutian Islands.

The eclipse takes place at noon in the Sea of Japan, where the sun will almost be totally hidden. At that point the tip of the cone of the moon's shadow comes very close to the earth's surface. Calculations show it will come within five miles of the earth at longitude minus 132 degrees 47 minutes, and latitude plus 40 degrees 51 minutes.

There the annular phase will last only 0.1 second. Thus second and third contacts—when the moon first hides the sun completely and when the sun reappears as the moon moves on—will occur practically simultaneously.

East and west from the above location the annular phase becomes longer the farther away the station is from the noon-point. In Indo-China and the Aleutians the annular phase lasts for about half a minute.

Since there is no real total phase, the usual investigations carried on dur-

ing a total eclipse cannot be undertaken. But this eclipse does offer a rare opportunity to achieve what has recently been called an "astronomical triangulation linkage."

If the times of contact are observed with great accuracy from stations of known geographic coordinates, they may be used for a check on longitudes. Prof. I. Bonsdorff of Finland has developed this method, suggested earlier by the Polish astronomer Prof. T. Banachiewicz.

The rapidly changing crescent near totality, when the Bailey beads appear, is recorded on movie film simultaneously with time-signals. The sun's image, snapped 24 times each second, will be 11 millimeters in diameter.

Such determinations have the advantage of being independent of the local variations of the vertical which affect the positions obtained by the astronomical-geodetic method. They can be of great value in bridging large distances across inaccessible regions or bodies of

water, and thus connect geodetic nets which have been established independently in various countries.

The present eclipse-line passes over a whole series of triangulation systems: the British Indian system in Eastern Burma, the Siam net, the Chinese and Japanese systems and even the American-Canadian one through the Aleutian Islands.

In view of the possibility of obtaining additional information regarding the figure of the earth as a basis for more accurate maps, the National Geographic Society is undertaking an expedition in cooperation with government agencies. They include the U. S. Air Force, the Army Map Service, the Signal Corps, the Naval Observatory, the Hydrographic Office, the National Bureau of Standards, the Coast and Geodetic Survey, and the State Department.

Seven Parties in Field

Seven land parties are now in the field. Each consists of an astronomer or geodesist, a radio-technician, a camera technician and a surveyor, together with the necessary camp personnel generously provided by the Army.

E. A. Halbach, director of the Milwaukee Astronomical Society, is in charge of the group at Mergui, Burma. At Bangkok, Siam, Prof. Charles H. Smiley,



PREPARING FOR ECLIPSE—Moving picture camera (35 mm) equipped with long focus lens and coelostat for observing 1948 annular eclipse is shown at the National Bureau of Standards.

director of Brown University's Ladd Observatory, is in command. The Rev. Francis J. Heyden, S. J., director of Georgetown University Observatory, is responsible for the observations at Wu-K'ang, China.

Dr. George van Biesbroeck of Yerkes Observatory is in command at Tenan, Korea. Reibun Jima, Japan, is under the supervision of Dr. John O'Keefe of the U. S. Army Map Service. Lt. Comdr. George R. Shelton and C. A. Shelton, both of the Coast and Geodetic Survey, lead two parties in the Aleutians.

Weather conditions in the Aleutians

are not promising as the Islands average about one sunny day in ninety. Consequently the U. S. Air Force is supplementing the land observations by sending two airplanes to undertake observations above the clouds.

The positions of the airplanes will be determined from signals received from Shoran stations, the locations of which are precisely known. These signals will be accurately tied in with the successive exposures made in the long-focus moving picture cameras in the airplanes, and with a time scale provided by crystal clocks.

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PHYSICS-PHYSIOLOGY

Four Balls Measure Heat

► A NEW four-balls instrument that tells better than the thermometer how hot you really are in summer was announced at the meeting of the National Academy of Sciences in Washington.

The instrument was devised by Drs. James D. Hardy and Charles H. Richards of Cornell Medical College. Ball radiometer and the more dignified term, panradiometer, are the names they have given it.

The four balls of the instrument are tiny, hollow silver ones, about the size of shoe buttons. The diameter of each is slightly less than a quarter of an inch. One is highly polished, one is blackened, one is white and one has heat put into it to compare with the temperature shown by the thermometer.

The instrument does the job of telling how hot you are because it measures not only the heat from the sun that strikes you directly but also the heat reflected onto you from buildings, pavements, and the like. The measurements include the heat from sunlight and the heat from the invisible heat rays of the sun.

The heat reflected onto you from surrounding objects is what makes you so much hotter on a down-town city street than on a suburban lawn.

A man standing still in the direct sunlight in New York City in the sum-

mer absorbs as much heat from the sun and the buildings and pavement as he would develop if he walked down the street at a fast trot, the new instrument showed.

The reason why the sun does not feel as warm in winter as in summer is that buildings and other surrounding objects do not give off as much heat in winter as in summer. In winter, standing in the sunlight, your body cools off, or loses heat, at the rate of about 60 calories per hour. But if the sun goes behind a cloud or you move into the shade, you lose heat at the rate of about 200 calories.

In summer in the sunlight in a city you get hot from the total heat radiated onto you about three times as fast as you cool off by losing heat in the winter in the sunlight. Heat radiated on you in summer sunlight is at the rate of 100 calories.

The measurements actually made with the instrument take into account the surface area of the body, its weight, time in hours or minutes, and the reflecting power of the skin and clothing in different parts of the sun's spectrum.

The instrument, reported at the meeting for the first time, will probably have practical applications for the armed services. They may use it, for example, for protection for men on duty in the Arctic and Antarctic or in hot desert regions.

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PSYCHOLOGY

Examine Rage Mechanisms

► WHETHER or not you fly into a rage when someone steps on you or refuses to obey your orders apparently depends on several distinct mechanisms in your

brain which interact as a series of checks and balances.

That is the case for cats, at least, Drs. Philip Bard and Vernon B. Mount-

castle of Johns Hopkins Medical School reported at the meeting in Washington of the National Academy of Sciences.

By removing a certain part of the brain, the neocortex, these scientists were able to produce extremely placid cats who failed to show any sign of anger when subjected to rough handling or quite strongly unpleasant stimulation.

Cats deprived of the entire forebrain, however, tend to show rage on rather slight provocation. So evidently one or more parts of the forebrain besides the neocortex continuously exert a suppressing effect on mechanisms in the lower part of the brain. It is these mechanisms which are "executively involved" in the bodily expression of anger. That is, it is these mechanisms in lower parts of the brain that make an angry cat spit or, perhaps, make the boss pound the desk when things go wrong.

Placid cats could be changed to ferocious ones by removal on both sides of the brain of either the cortex of the midline or certain parts of the so-called olfactory brain. But of a variety of operations in which more restricted parts of the forebrain on both sides were removed, the only one which caused "a gentle normal cat to become savage" was removal of amygdala and pyriform lobes. These two brain structures, one almond-shaped and one pear-shaped, are parts of the so-called olfactory brain.

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GENERAL SCIENCE

Condon Attack Jeopardized U. S. Scientific Program

► WHEN the Thomas Un-American Activities Sub-Committee of the House attacked Dr. E. U. Condon, Bureau of Standards director, it jeopardized the effectiveness of the entire scientific research program of the government, the American Association for the Advancement of Science's Executive Committee declared.

Protesting against the House sub-committee giving wide publicity to charges against Dr. Condon without holding any hearing, the committee composed of 11 U. S. science leaders, warned that "the continuation of American scientific achievement for the purposes of both peace and war depends upon the freedom and peace of mind of our scientists."

While scientists have no right to ask special privileges, the resolution states, the rights of every citizen under the Constitution and Bill of Rights should protect them against such treatment as accorded Dr. Condon.

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ASTRONOMY

Golden Age of Astronomy

Dawn of this new period is indicated by five new developments in sky study, among which are the 200-inch telescope, radioastronomy and coronagraphs.

► A NEW golden age of astronomy is dawning, due to five new developments in sky study.

Dr. Harlow Shapley of Harvard College Observatory, Cambridge, Mass., lists the new astronomical tools as:

1. The 200-inch telescope on Palomar Mountain, which will reach eight times the volume of space now known.

2. Radioastronomy, exploration by radar and other high-frequency waves, which will capture new facts about the earth's atmosphere and regions near the earth.

3. Small but wide-angled photographic telescopes of the Schmidt type that cover large areas of sky.

4. Light-sensitive cells that record variations in light more accurately than is possible with the human eye and extend the "vision" of astronomers into the region of the invisible "heat-light" of faint stars, planets and sun.

5. Coronagraphs that let astronomers see the sun's outer atmosphere or corona every clear day by producing a man-made total eclipse of the sun.

The 200-inch telescope on Palomar Mountain, scheduled to go into operation early this summer, will penetrate twice as far into space as has been possible previously. Pinpointing its sights on distant bits of light, it will bring within our reach a sample of the universe eight times as great as that now available.

Radioastronomy is a new branch of astronomy only recently announced, Dr. Shapley stated. By use of high-frequency radio waves meteors are tracked in their flight across the heavens through clouds and even in full sunlight. The ever-changing ionized layers of our atmosphere—the earth's invisible radio roof—are also explored by radio waves of short wavelength.

The trick of bouncing radio waves off the moon has also given us a tool with which to explore space between here and the moon. Microwaves from the sun enable astronomers to explore the areas around sunspots for sources of electromagnetic waves. Cosmic static furnishes us with another method for identifying a region in the constellation of Sagittarius, the archer, as the center of the

Milky Way system of which the earth is a part.

The Schmidt camera, the Super-Schmidt for studying meteors, and the Baker-Schmidt, a two-mirror combination still in the blueprint stage, all cover large areas of the heavens. Schmidt-type cameras are especially good for survey work, particularly for studying the Milky Way, Dr. Shapley reported.

For accurately detecting the light of distant stars, photocells are stable, dependable and accurate. Application of the new lead sulfide cell to astronomy has extended the usable red end of the spectrum of the sun, planets and brighter stars.

New instrumentation for solar research points to a new epoch in analyzing the surface of the sun, Dr. Shapley said. The coronagraph enables us to study the sun's outer atmosphere without having to wait for those infrequent total solar eclipses. Monochromatic filters developed for the coronagraph isolate tiny sections of light from the sun's disk so that activity of hydrogen and calcium gases 93,000,000 miles away can be detected.

V-2 rockets, by furnishing us with a means of getting above the ozone that blocks out the sun's ultraviolet rays, can help discover some of the secrets of our nearest star—the sun.

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AGRICULTURE

Infra-Red Radiator Now Protects Fruit Orchards

► THE infra-red radiation that enabled soldiers to see enemies in the dark by use of the snooperscope is now ready to combat frost in fruit orchards. Oil-burning infra-red generators, developed by the Michigan State College, may find wide use.

The radiator used is one of its most interesting features. It has five horizontally placed reflectors that focus the rays at a distance of about 80 feet from the unit. Scattering of rays causes them to cover an area of more than an acre.

The combustion chamber is placed at the base of the stand on which the re-

flectors are held. Kerosene or fuel oil is used. The unit consists of small diaphragm-type pump, driven by a one-twentieth horsepower, six-volt, direct current motor. Fuel is in a nearby tank. The pump will supply the fuel for a steady flame for over 20 hours off one charge of a 120-ampere hour, six-volt auto-type storage battery.

The pump used is also a development of the college engineering department. The pump and burner may have other uses.

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PHYSIOLOGY

Thin Scalps Grow Bald Sooner than Thick Ones

► IT may be unjust to tell a middle-aged man who still has a bushy head of hair that he's a fathead; but Dr. M. Wharton Young of Howard University did say before the American Association of Anatomists, meeting in Madison, Wis., that thin scalps tend to grow bald sooner than thick ones, and that one aid to having a deep bed for your hair roots to grow in is to have a layer of fat under the skin. Main thing in keeping your hair is a rich supply of blood vessels, and these become scanty in thin scalps.

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RAY'S GUARD ORCHARDS — Michigan State College scientists have installed the infra-red radiator in orchards for experiments with the new frost-fighting apparatus. The picture shows the most efficient type yet developed.

CHEMISTRY

Light-Absorbing Pigments Give Off Vivid Colors

➤ YOU'LL be painting your house with "invisible sunlight" thanks to pigments that soak up light you can't see and give off vivid color.

Chemical research reported to the American Chemical Society meeting in Chicago by Dr. C. E. Barnett of the New Jersey Zinc Co., Palmerton, Pa., has increased tenfold the luminescent qualities of paint pigments.

During the war major improvements were made in materials that glow in the dark, and now the fact that some of these have "daylight fluorescence" is being applied to signs, soap and paint.

Ultraviolet light is absorbed on striking the materials and then emitted as visible color. The addition of this color to the normal reflection gives a more brilliant hue than can be obtained by reflection alone.

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CHEMISTRY

Sugar Can Be Made from Treated Oak Wood Waste

➤ HERE are some of the newest achievements of chemistry, reported to the American Chemical Society meeting in Chicago:

Sugar made from waste oak wood.

Sweeter molasses plus a sugar-cane by-product for soap production.

A new softener for some types of plastic from sour milk.

Cheaper alcohol for auto fuel.

Sugar can be made from oak wood waste, Dr. Elwin E. Harris of the Forest Products Laboratory, Madison, Wis., told the chemists. By treating it with a little sulfuric acid under steam pressure, it can be made to yield 45% sugar.

Sugar cane can be made to produce a by-product of use in synthetic soap making and the molasses will be sweeter as the result. R. J. Furse and Leon Godchaux II of New Orleans told of success in extracting the aconitic acid, which is also a softening agent for plastics and rubber.

Lactic acid, the tang of sour milk, can now change waste farm products into softeners for vinyl plastics products, a chemical team from the U. S. Department of Agriculture's Eastern Regional Research Laboratory, Philadelphia, reported. Dr. C. E. Rehberg, Marion B. Dixon and Philip E. Meiss explained that the agricultural products otherwise wasted would replace chemicals made

from oil, now in short supply.

A step toward cheaper use of alcohol for automobile fuel was reported by Dr. Donald F. Othmer of Brooklyn Polytechnic Institute, who told the chemists that the use of a new distillation process makes it just as cheap to produce absolute alcohol, 100% free from water, as the ordinary industrial alcohol which contains 5% water, interfering with its use as fuel.

Science News Letter, May 1, 1948

ENTOMOLOGY

Pin-Point Bombing Technic Developed to Kill Insects

➤ A PIN-POINT bombing technic, developed from Chemical Corps war research on poison gases, can now be applied to DDT destruction of disease-carrying mosquitoes and flies, Prof. Victor K. LaMer of Columbia University and Dr. Seymore Hochberg of Du Pont announced at the meeting in Chicago of the American Chemical Society.

The new technic involves use of an aerosol, or fine fog, of DDT solution. But the aerosol is made so that each droplet of DDT is exactly the right size to hit the body of mosquito or fly. Each droplet contains enough DDT to kill a single insect.

Larger droplets, like spray droplets, the scientists pointed out, fail to kill the insects because the droplets fall to the ground too quickly. Smaller ones are caught in the tiny air currents around each mosquito and flow around the insect without depositing on it. The mosquito is protected against these droplets by its streamlined body.

The ideal droplet size was found to be about 10 microns (four ten-thousandths of an inch) in diameter. It is achieved by a new generator invented by Prof. LaMer and Dr. Hochberg. Superheated steam catches and disperses droplets of oil-containing insecticide by passing the mixture through a tiny opening. Smoke screen generators in use before the war produced droplets which were too small and which also destroyed the DDT with heat.

Under favorable conditions, all mosquito life has been destroyed for more than a mile downwind from the fog generator with an outlay of only one pound of insecticide for every five acres of open country, the scientists reported.

By employing aerosols, or fine fogs, it is possible to kill mosquitoes and black flies, which are extremely susceptible to DDT, while birds, fish, bees, and other forms of animal life are left unharmed.

Science News Letter, May 1, 1948

IN SCIENCE

CHEMISTRY—NUTRITION

New Preservation Methods May Destroy Vitamins

➤ NEW methods of preserving food by bombarding it with X-rays, radar waves and electrons may destroy vitamins, necessary to high-quality diets, Prof. Bernard E. Proctor and Samuel A. Goldblith, of the Massachusetts Institute of Technology food technology laboratories, warned chemists at the American Chemical Society meeting in Chicago.

X-rays and electrons (cathode rays) destroy the organisms that cause spoilage in foods, without heating the food appreciably. But niacin, the anti-pellagra factor of the B-complex vitamins, is destroyed partially by X-rays and electrons.

The new electronic methods of preserving food are very promising because the food's natural flavor is retained.

Science News Letter, May 1, 1948

CHEMISTRY

Tastier Food Is Promise For Heart Patients

➤ THE food of heart disease patients won't have to lose its savor because a Brooklyn scientist has applied to water in the human body the same chemical trick that was used to desalt sea-water.

Dr. I. J. Greenblatt of Beth-El Hospital, Brooklyn, while serving in the Pacific area realized that the principle of the ion-exchange desalting emergency kits of planes and lifeboats could be applied to heart cases characterized by dropsy and swelling of the joints.

He and M. E. Gilwood of the Permutit Co., New York, told the American Chemical Society meeting in Chicago that three tablespoons of a synthetic plastic swallowed after and before meals seem to allow such cardiac cases to eat a more normal diet.

Saltless, tasteless diets largely of rice and starch have had to be the food of such heart cases. With doses of the new plastic, more normal food can be eaten as the material removes salt within the intestinal tract before it can get into the blood stream.

The ion exchange material used is a synthetic resin ground into tasteless powder grains coated with fatty chemicals and shellac.

Science News Letter, May 1, 1948

SCIENCE FIELDS

VETERINARY MEDICINE

Worms May Clear Mystery Of How Diseases Spread

►THE mystery of how some diseases spread may be cleared through a lead reported at the meeting of the American Philosophical Society in Philadelphia.

Worms, Dr. Richard E. Shope of the Rockefeller Institute for Medical Research reported, spread the germs of at least three animal diseases.

The diseases are blackhead of turkey, salmon poisoning of dogs and influenza of swine.

Swine influenza is caused by the concerted activity of a bacterium and the swine influenza virus. The virus has as its intermediate host the common swine lung-worm.

It is believed, Dr. Shope said, that the three diseases now known to be spread by worms represent only a portion of a larger group. Further investigation should be made of worms as possible germ-carriers in diseases whose manner of spread is still not completely understood.

Science News Letter, May 1, 1948

MEDICINE

Radioactive Porphyrins Suggested as Cancer Aid

►A NEW method for cancer detection, that may also prove useful in cancer treatment, was described before the meeting of the American Association of Anatomists in Madison, Wis., by Dr. Frank H. J. Figge and Dr. Glenn S. Weiland of the University of Maryland school of medicine. Thus far, they have cautiously used it only on cancerous mice; but the principle seems capable of general application, and possibilities of its eventual extension to take in the field of human cancers is being investigated.

The compounds used by the Maryland researchers belong to the rather complex organic group known as the porphyrins. Porphyrins themselves are cancer-provokers, and they have an affinity for rapidly growing tissues anywhere. They tend to concentrate in such things as developing embryos and healing wounds, where their presence can be demonstrated through their red fluorescence

under ultraviolet light. Drs. Figge and Weiland injected porphyrins into cancerous mice, and later found the animals' tumors to be redly fluorescent.

With this demonstration of porphyrin concentration in cancers in hand, they now suggest the desirability of hitching radioactive metal atoms, like those of sodium, onto the porphyrin molecules. Increased radioactivity of any given part of the body would then be legitimate grounds for suspecting cancer; and possibly the radioactivity of the tracer element would in itself prove a helpful treatment of the condition.

Science News Letter, May 1, 1948

SEISMOLOGY

Man-Made Quake Waves Studied After Explosions

►SMALL, man-made earthquake waves have been recorded nearly 200 miles away from an explosion with sensitive new instruments developed by Carnegie Institution of Washington scientists.

The instruments are small, portable versions of the seismographs which register earthquakes. But the shocks are from the blast of hundreds of pounds of high explosives set off on the bottom of the Patuxent River near Washington.

Scientists conducting the experiments include Drs. M. A. Tuve, R. W. Goranson and J. W. Greig, and W. J. Rooney, J. B. Doak and J. L. England.

Explosions on the bottom of the Patuxent river have been set off at intervals for more than a year. Seconds after a blast, waves through the earth are recorded on the scientists' instruments at points at varying distances and directions from the explosion.

This new information is helping the Carnegie Institution scientists plot a unique map. It will show what the earth is like down to 30 miles under the nation's capital and nearby states.

In addition to the explosions in the Patuxent river, blasting in quarries in Maryland, Virginia, Pennsylvania and New Jersey have been recorded.

Thus far, Somerset, Pa., is the farthest point from the river explosions where the new instruments have detected the seismic waves, but the scientists believe that they can be used up to 250 miles.

Natural earthquakes have given science many clues about the earth below the surface, but tremors are too unpredictable for the systematic study of a region. Now, the Carnegie scientists are creating their own seismic waves for the new experiments.

Science News Letter, May 1, 1948

GENERAL SCIENCE

Revised Foundation Bill Approved by Committee

►A REVISED bill to establish a National Science Foundation has been approved by the Senate's Committee on Labor and Public Welfare.

The bill, which supporters of the proposed Foundation hope will be voted on by the Senate soon, now gives fewer powers to the nine-man executive committee than were listed in the original bill. Several of the functions and powers of the executive committee have been given to the full Foundation membership of 24.

Taken out of the bill by the Senate committee were specific provisions for special commissions on cancer, on heart and intravascular diseases and on poliomyelitis and other degenerative diseases. It is now stated simply that the Foundation may establish such special commissions as it deems necessary.

The bill was introduced in the Senate by a bipartisan group of Senators, while an identical measure is being sponsored in the House of Representatives by Rep. Charles A. Wolverton, R., N. J. The House bill has not yet been reported out of the Committee on Interstate and Foreign Commerce, of which Rep. Wolverton is chairman.

Science News Letter, May 1, 1948

CHEMISTRY

Wrinkle-Proof Cottons Soon To Be Available

►ALL types of cotton will soon be available that withstand summer wear without wrinkling because treated with a new finish which also controls shrinkage to a low limit. The finish will be known as Superset, and is a product of the American Cyanamid Company.

Wrinkle-resistant finishes have been widely used for rayon fabrics but up until now only heavy cotton could be treated with them because they seriously weaken the fabric. The new material causes little or no loss of tensile strength. The finish is effective after many severe test washings.

Melamine resin forms the basis of the new preparation. It has been modified in such a way that it does not affect the strength of the fabric. It is applied in the mills, and has been successfully tested in use with gingham, dress goods, prints, denims, corduroys, seersuckers and other types of cotton garment material.

Science News Letter, May 1, 1948

ASTRONOMY

Five Planets Now Visible

Brightest of these is Venus which appears long before any other star or planet. Annular eclipse of the sun is expected this month.

By JAMES STOKLEY

➤ ALL of the five planets that are ever visible to the naked eye—Mercury, Venus, Mars, Jupiter and Saturn—can be seen on evenings of May, though not simultaneously. Brightest of the quintet is Venus, which stands high in the west in the constellation of Gemini, the twins, at sunset. On May 18 it reaches greatest brilliance, magnitude minus 4.2 in the astronomical scale, about 120 times as bright as an average star of the first magnitude. Because of its splendor it appears long before any other star or planet, so there is little difficulty in locating it.

The position of Venus, nevertheless, is shown on the accompanying maps. These depict the sky as it appears at 11:00 p.m., your local kind of daylight saving time on May 1, an hour earlier in the middle of the month and two hours earlier at the end. By May 31, however, sunset is so late that it is not yet dark at 9:00 p.m. (8:00 p.m. standard time).

Toward the southwest, in the constellation of Leo, the lion, and Cancer, the crab, appear two more planets. Mars, red in color, is close to the star Regulus and passes about a degree north of it on May 15. It is now of magnitude 1, slightly brighter than the star. A few degrees to the west of Mars, just across the border in the next-door group of Cancer, is Saturn, of magnitude 0.6, which makes it about half again as bright as Mars.

Jupiter Second in Brightness

A planet that is second in brightness only to Venus (which exceeds it about seven times) appears in the east about an hour later than the times for which the maps are drawn. This is Jupiter, in Sagittarius, the archer, the group next to Scorpius, which is partly visible on the maps at the southeastern horizon.

Last of our planets is Mercury, which moves in the orbit nearest the sun. Thus it never remains visible long after sunset, but on May 28 it is in the best position of the year. It will then be in Taurus, the bull, just below Gemini, and its magnitude will be minus 0.7. As the

sun goes down, it will be about 18 degrees above the horizon (it is 90 degrees to the zenith) and soon after that it may be glimpsed in the gathering dusk. By the time the sky is completely dark it will be gone from view.

Vega, in the constellation of Lyra, the lyre, in the northeast, is the brightest star visible these May evenings. Second is Capella, in Auriga, the charioteer, toward the northwest. High in the south, marking the figure of Bootes, the bear-driver, is Arcturus, third in our list. Below this group stands Virgo, the virgin, with Spica, another star of the first magnitude. Next to the right-hand end of that area we see Leo, the lion, with the star Regulus and the planet Mars, already noted.

Gemini Is Brightest Star

The brightest star in Gemini, where we see Venus, is Pollux. The star Castor, which marks the other twin, is second magnitude. Procyon, in Canis Minor, the lesser dog, seen low toward the west, is another of the first magnitude, as is Antares, in Scorpius. This, however, is so low in the sky, that its brightness is greatly dimmed.

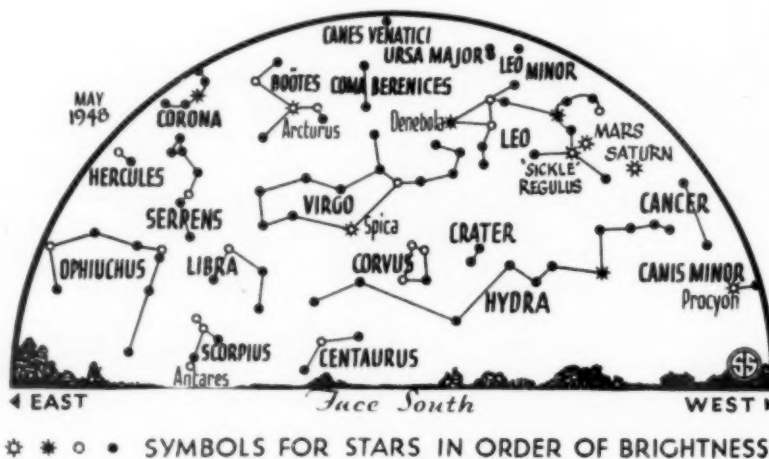
Like the same month a year ago, May brings an eclipse of the sun, but there are important differences. That of May 20, 1947, was total. Because the sun is so much larger than the moon—864,000 miles as compared with 2,160—the

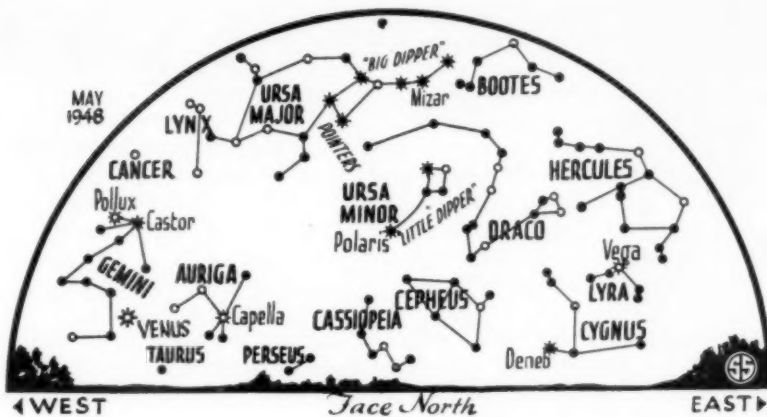
shadow of the moon is conical. It tapers to a point at an average distance of 232,100 miles from the moon's center. As the actual distance between sun and moon changes, its length is altered also. Thus it can be as short as 228,200 miles or as long as 236,000 miles. The distance between moon and earth varies from 221,463 to 252,710 miles. Therefore the shadow does not always reach as far as the earth. It did last May, when the tip of its shadow swept across South America and Africa, and persons along that path saw a total solar eclipse with the sun completely hidden by the moon.

Annular Eclipse of Sun

Every time the moon is new it is nearly between sun and earth. On most such occasions, the lunar shadow passes either south or north of our planet and there is no eclipse, such as occurred in May, 1947. This year, on May 8, the moon is new, and again it is in line with sun and earth, only this time the shadow does not quite reach us. The result is an "annular," rather than a total, eclipse. Even along the path on the earth traced out by the direction of the shadow the sun is not completely covered. A ring of solar surface, called the annulus, remains visible around the lunar disk.

The path along which this occurs starts in the Indian Ocean, crosses Siam, China, the Sea of Japan, Japan, the Sea of Okhotsk, the Kurile Islands, the Pacific Ocean and the Aleutian Islands. At a point in the Sea of Japan, according to calculations, the tip of the shadow will be only five miles above the ocean. Since





the computations are subject to this much uncertainty, it may be that from this position there will just barely be a total eclipse, with the sun's disk completely covered, but if so, it will be very brief.

A total eclipse permits complete observation of the sun's outermost layer, the corona, as well as other effects visible only at such a time. The remaining ring of sunlight prevents these at an annular eclipse, so ordinarily astronomers pay little attention to them. This time, however, the National Geographic Society, in collaboration with the State Department, the Coast and Geodetic Survey, the National Bureau of Standards, the Army, Navy and Air Force, will make observations from a number of locations along the path. Their aim will not be more knowledge of the sun, but of the earth. If the observations are successful, and made with sufficient precision, their analysis will yield the most accurate determination ever made of the size and shape of our globe. These should permit relative positions on the earth to be pinpointed within 150 feet or less. Now, in some cases, the precision of determination of a place may be in error by as much as several hundred feet up to a mile. In case of a war using long range missiles guided by automatic means, this increased precision might mean the difference between a hit and a miss on a vital target.

A rather curious feature of this eclipse, which is true of any that starts in the eastern hemisphere and ends in the western, is that it ends the day before it starts! The beginning of the 5,320-mile path is west of the International Date Line, at 180 degrees longitude, where it is already Sunday, May 9. But on the eastern side of the line it is still Saturday, May 8. By Eastern Daylight Saving Time, the eclipse will begin, at the western end of its path, at 8:45 p.m., and will reach the eastern end at 12:06

a.m. Over most of Asia, the northern part of the Pacific Ocean, Alaska and northwestern Canada, a partial eclipse will be seen, but nothing of this will be visible from the United States.

Time Table for May

May 1	8:00 p. m.	Moon farthest, distance 251,-200 miles
4	early a. m.	Meteors coming from direction of constellation of Aquarius
8	9:30 p. m.	New moon—annular eclipse of sun
12	4:33 a. m.	Moon passes Venus
15	3:14 a. m.	Moon passes Saturn
	11:00 a. m.	Moon nearest, distance 229,-800 miles
	7:55 p. m.	Moon in first quarter
16	12:15 a. m.	Moon passes Mars
18	4:00 a. m.	Venus at greatest brilliance.
22	7:37 p. m.	Full moon
24	5:57 p. m.	Moon passes Jupiter
28	8:00 p. m.	Mercury farthest east of sun, visible for a few days around this date shortly after sunset
29	3:00 p. m.	Moon farthest, distance 251,-200 miles
30	5:43 p. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.
Add one hour for the corresponding Daylight Saving Time.

Science News Letter, May 1, 1948

ATOMIC ENERGY

Uranium Is too Scarce for Use as Source of Fuel

► THE atomic bomb element, uranium, is so scarce it should not be used as a major source of fuel or power, a famous physicist warned.

Dr. Robert Andrews Millikan, Nobel prize winner in physics and retired head of the California Institute of Technology, declared that the world's supply of uranium is "easily exhausted."

He discussed atomic energy as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Uranium, he pointed out, is only six parts in a million in the earth's crust. It is "not quite as rare as gold, but it is exceedingly rare."

Even with other heavy elements as

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Germans are reported to have used *electronic heating* during the war in lumber drying, wood gluing, cigarette curing, plastics heating, lice killing, and food processing.

Jackrabbits have played a large part in scattering juniper trees, often called cedar, on prairie grasslands in Texas and Oklahoma; the rabbits eat the berries of the tree but do not crack the seeds and they pass through the digestive tract uninjured.

Teamsters of earlier years are said to be responsible for the American custom of passing on the right; they rode the left rear horses of their four-to eight-horse teams so that their right, or whip, hand would be free to reach all animals, and passed on the right to see clearance with other wagons.

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possible sources of atomic energy, Dr. Millikan said, the world's atomic resources are limited.

"They are easily exhausted and therefore they will be increasingly costly," he cautioned.

The scientist declared that the suggested use of the lightest element, hydrogen, for the release of atomic energy, a process which is believed to take place on the sun, "is forever unattainable on earth."

Only four important deposits of uranium are known, Dr. Millikan reported. These are in Belgian Congo, Czechoslovakia, Canada's Big Bear Lake and the carnotite ores of southwestern Colorado and southeastern Utah. Most important are the ones in Belgian Congo and Canada.

New sources of the atomic bomb element may be found, but "uranium will continue to be a very scarce element," he

predicted. Calling for conservation of atomic resources, he asserted uranium "should not be used for any major fuel or power purpose."

Without using uranium, Dr. Millikan said, we already have unlimited sources of atomic energy. Gas, oil and coal, "three forms of bottled sunlight," are really a form of atomic energy, he explained.

The atomic process in the sun that gives us these standard forms of fuel is due to "atom-building," instead of "atom-disintegrating," which is used in the atomic bomb, the scientist added.

"The greatest service to mankind of the atomic bomb and atomic energy," Dr. Millikan suggested, "would be to make clear as crystal to all classes and conditions of men the world over the necessity for eliminating aggressive war."

Science News Letter, May 1, 1948

ZOOLOGY

Cancer Cells Transformed

► TRANSFORMATION of cancer cells to normal cells was reported by Drs. S. Meryl Rose and Hope M. Wallingford of Smith College at the meeting of the National Academy of Sciences in Washington.

The transformation was accomplished by transplanting a cancer from a frog into the limb of a salamander and, after the cancer graft had taken, cutting off the limb through the cancer.

In all cases the salamander grew a new limb in the normal way. Within the new, regenerated salamander limb were patches of normal frog muscle, cartilage and fibrous connective tissue. These had grown, or regenerated, from the transplanted frog cancer. Most of them were next to unchanged cancer cells which remained in the old part of the salamander limb above the line of amputation.

Normal tissues in regenerating limbs, the scientists pointed out, go back to the embryonic state in which the cells are undifferentiated. Then, as the cells grow they differentiate into new tissues, just as the embryo cells differentiate into muscles, bones, nerves, and glands.

Because cancerous tissue seems to be abnormally differentiated, the scientists tried to see whether it could be forced back to the embryonic state of no differentiation from which it would be transformed into normal tissue as the cells regenerated.

Frog cancers were transplanted into

salamander limbs so that the former cancer cells could be recognized if they did go back to normal. The frog cancer cells have small nuclei, whereas salamander limb cells have much larger nuclei. The difference in size of cell nucleus made it possible for the scientists to tell which cells in the new salamander limb were salamander cells and which were originally frog cancer cells transformed to normal.

Science News Letter, May 1, 1948

GEODESY

Parachuted Flares Aid In Charting Locations

► RADIO-timed flares dropped on parachutes from high-flying planes, instead of lights on top of high skeleton towers, are the newest technique for enabling geodetic surveyors to pin-point locations on charts with great accuracy. The method was described before the meeting of the American Geophysical Union in Washington by Lt. Comdr. F. R. Gossett of the U. S. Coast and Geodetic Survey.

A tryout tying in the coasts of Florida and the Bahamas has given assurance that results are valid if conditions are right. The weather has to be perfect, so that six flares dropped simultaneously, three over accurately known locations and three from undetermined spots, can be seen at the same time. Possible ranges run up to 200 miles.

Science News Letter, May 1, 1948

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A mineral that makes you see double; a small lens that enlarges letters and objects; materials with which to assemble a dry-cell—these are the exciting objects contained in the MINERAL OPTICS, GLASS LENS AND DRY CELL UNITS making up this collection. In the picture (upper left) you see ten GLASS LENS UNIT specimens, including a square glass blank for molding a lens, molded blank, partially polished blank, finished lens, and envelopes of emery and rouge with which you yourself can grind glass. A red filter, magnifier, mirror and photographic lens part are also included. The upper right group includes iceland spar, phlogopite and labradorite, all part of the MINERAL OPTICS UNIT. A factory-assembled dry cell and the materials needed to make one at home—zinc can, wrapped bobbin, bottom washer, top collar, sealing compound and label—are shown at center as included in the DRY CELL UNIT. Also included are a tiny flashlight bulb, litmus paper, cardboard washers, tinned copper wire, insulated copper wire, iron rod and iron filings with which you can perform experiments in electricity.

2 COLOR COLLECTION

Paints that glow in the dark; red and green plastic sheets that together cut out all light; brilliant dyes obtained from plant roots—these and many other intriguing specimens are contained in the PHOSPHORESCENCE, PLASTIC PILOT AIDS AND VEGETABLE DYES UNITS which make this colorful collection. There are fourteen specimens in all, including blind flying sheeting in red and green, dimout blue sheeting, ultra violet transmitting sheeting, phosphorescence plastic, tape, pigment, paint, madder, indigo, tumeric and alum.

4 MINERAL COLLECTION

Stones showing the original structure of trees that grew millions of years ago; vacuum tube insulator made from one of the softest known minerals; rock containing traces of native sulfur—these are the surprising subjects in the PETRIFIED WOOD, TALC and SULFUR UNITS making up this collection. In the three boxes there are seventeen specimens, including petrified sweetgum, redwood, oak, elm and bog, fired and natural talc, sulfur-bearing limestone, iron sulfide, zinc sulfide, crude sulfur and flowers of sulfur.

6 TASTE COLLECTION

Raw chicle from which chewing gum is made; unopened flower buds used as spices; an edible wetting agent—these are only a few of the exciting specimens contained in the CHICLE, SPICE and LECITHIN UNITS that form this unique scientific group. There are twenty-two specimens in the collection, including raw chicle, finished chewing-gum base, powdered sucrose, dextrose, corn syrup, oil of peppermint, candy-coated gum, allspice, caraway, celery, cinnamon, cloves, ginger, sage, soybean flakes, pure lecithin used chiefly for medicinal purposes and lecithinated flour.

8 UNUSUAL MATERIALS COLLECTION

Porous cushioning material for upholstery; glass-enclosed air cells used to keep out heat or cold; zinc made fine-grained by incorporation of only 0.05% lithium—these materials of industrial importance are contained in the HOUSING, HOME AND OFFICE AND LITHIUM UNITS. The eighteen specimens contained in these three blue boxes include wood-fiber wallboard, plywood, glass fiber fabric, coffee measure, airfoam, plastic and wire screening, shaver head, natural spodumene, lithium chloride, lithium nitride, pure zinc, zinc and lithium master alloy, and lithium-treated zinc.

3 FIBER COLLECTION

Synthetic fiber made from skim milk; twisted rayon cord used in auto tires; glass fibers less than three ten-thousandths of an inch in diameter—these are the interesting subjects of the CASEIN, RAYON and GLASS FIBER UNITS that will be sent to those selecting this collection. In the three boxes that make up this series of exhibits there are fifteen specimens, including casein powder, raw fiber spun from casein, aralac, soft glass fiber, cotton linters, chemical cotton pulp, rayon tire cord and rayon fabric lining material.

5 PLASTIC COLLECTION

Film with a seam that is stronger than the plastic itself; plastic plate with which you can print a bit of illustration or writing; plastic-coated yarn for crocheting or braiding a design—these are the rewarding specimens contained in VINYL RESIN FILM, PLASTICS IN PRINTING and PLASTIC COATED YARN UNITS which comprise this unusual scientific collection. There are 20 specimens, including vinyl plastic film, heat sealed seam, spot welded ruffle, plastic printing plate, moisture-proof sheeting, twist leaflet binding, plastic-coated yarn, flame-retardant webbing and fine fabric.

7 TEXTILE COLLECTION

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City, Zone, State _____



A Worsening World

► **ATOMIC WAR** is not the most serious threat to the continued existence of the human race today; man is threatened with self-destruction through reckless misuse of the land that destroys his very means of subsistence, declares Dr. Fairfield Osborn, president of the New York Zoological Society. In a new book, *Our Plundered Planet*, published by Little, Brown and Company (\$2.50), he traces the consequences of man's need and greed through the centuries, and points out the fate that will be inevitable if our present land-ruining practices are permitted to persist.

Despite the pressure of hungry millions on food resources, greed seems to have played a larger part than need in wasting the soil. Deforesting upper mountain slopes, plowing good pasture into bad fields, overloading the range with too many sheep (and worse still, goats) is a story that has been repeated over and over through the ages. That is why ruined temples stand today in Syria on stony hills that were once soil-covered. That is why sand clogs Roman cities in North Africa. That is why mod-

ern Spain is a land of agricultural slums, breeding revolt. That is why "Okies and Arkies" streamed out towards California half a generation ago—and may do so again.

The slogan, "America can feed the world," is a delusion, Dr. Osborn declares; America may soon be having difficulties feeding herself. Even newer lands, like Australia and New Zealand, are already suffering almost as badly as we from the consequences of forest destruction, boom wheat planting, and insane overgrazing.

Nor is much help to be expected from the "undeveloped" humid tropics, he continues, relentlessly. Nobody wants to

live in them anyway, and in any case most tropical soils are no good for really productive farming if they are cleared—and are not then promptly washed away by torrential rains. We shall have to seek our own salvation at home.

"The question remains," Dr. Osborn concludes. "Are we to continue on the same dusty perilous road once traveled to its dead end by other mighty and splendid nations, or, in our wisdom, are we going to choose the only route that does not lead to the disaster that has already befallen so many other peoples of the earth?"

Science News Letter, May 1, 1948

OPHTHALMOLOGY

Less Light for Eye Work

► **YOU** don't need nearly as much light for close visual work as the standards recommended by the code of the Illuminating Engineering Society. This is the conclusion of Drs. Ernst Simonson and Josef Brozek, of the Laboratory of Physiological Hygiene, University of Minnesota.

They question the present standards as a result of tests on six young men in good health who each put in two hours of difficult eye work. It was so severe as to be equivalent, the investigators believe, to about six to eight hours in industry. The task was designed to duplicate essentially the recognition of fine details necessary on a conveyor inspection job.

In addition to measuring the work turned out during the two hours, tests were made before and after the work to reveal the extent of fatigue. The experiments were conducted repeatedly at six illumination levels of 2, 5, 15, 50, 100, and 300 footcandles.

The best illumination for this kind of

work was found to be 100 footcandles. This is at or below the minimum recommended by the I. E. S. The scientists on whose work the I. E. S. standards are based recommend as much as 500 to 3,000 footcandles for discriminating fine details.

Increasing the illumination above the optimum of 100 footcandles only resulted in more fatigue and poorer performance, it was found, even when glare was excluded.

A light of 100 footcandles is about that of a 500-watt lamp at a distance of three feet or less. A 300 footcandle illumination would call for a 1,500-watt lamp at the same distance.

The Minnesota scientists have reported their findings in the *Journal of the Optical Society of America* (April).

Science News Letter, May 1, 1948

ORNITHOLOGY

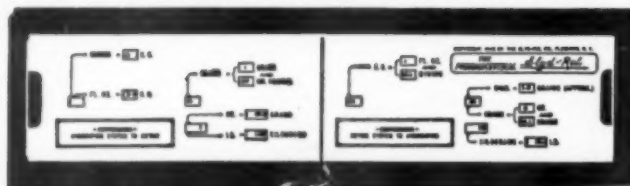
Barn Swallows' Nests Made From Pellets of Mud

See Front Cover

► **YOUNG** barn swallows are reared in nests constructed from pellets of mud mixed with pieces of straw and grass, as shown on the cover of this week's *SCIENCE NEWS LETTER*. The nests are generally stuccoed against a barn rafter or joist, and carefully lined with soft feathers. Sometimes as many as a dozen pairs of barn swallows will have nests near each other. As the parent birds flutter around their nests or circle low about the fields their twittering song fills the air with a feeling of good cheer.

Science News Letter, May 1, 1948

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Books of the Week

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A. S. T. M. STANDARDS ON PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS—*American Society for Testing Materials*, 562 p., illus., paper, \$4.35. Specifications, methods of testing, definitions of terms.

BIOLUMINESCENCE—E. Newton Harvey and others—*New York Academy of Sciences*, 156 p., illus., paper, \$2.50. A collection of papers on animal light such as from the firefly and luminous fish and bacteria.

BOTANIK DER GEGENWART UND VORZEIT IN CULTURHISTORISCHER ENTWICKELUNG: Ein Beitrag zur Geschichte der Abendländischen Völker—Karl F. W. Jessen—*Chronica Botanica*, 495 p., paper, \$6.00. An offset reprint edition duplicating exactly a classic in botany originally published in 1864.

CHEMICAL ARCHITECTURE—R. E. Burk and Oliver Grummitt, Eds.—*Interscience*, 202 p., illus., \$4.50. A group of technical papers by authorities in their various fields.

CRYSTALLINE ENZYMES—John H. Northrop, Moses Kunitz and Roger M. Herriott—*Columbia University Press*, 2d ed. rev., 352 p., illus., \$7.50. Containing new material on the synthesis of proteins and the formation of viruses, at least some of which are now believed to be proteins.

THE EARTH'S FACE AND HUMAN DESTINY—Ehrenfried Pfeiffer—*Rodale Press*, 182 p., illus., \$2.75. A book on conservation by a Swiss writer.

THE GENIUS OF INDUSTRIAL RESEARCH—D. H. Killeffer—*Reinhold*, 263 p., illus., \$4.50. This account of how industrial research is conducted is intended especially to guide those entering the field. The illustrations are taken mostly from industrial chemistry.

GUIDE TO EASTERN FERNS—Edgar T. Wherry—*University of Pennsylvania Press*, 2d ed., 252 p., illus., \$2.00. An aid to identification.

HANDBOOK OF APPLIED PHARMACOLOGY—Frederick Schroeder and Arthur W. Grace, Eds.—*Long Island College Hospital*, 133 p., \$2.00. A listing of drugs and recommended dosages, using metric units and including tables of conversion to apothecary system. Chemical preparations are listed under both chemical and proprietary names.

HOW TO TAKE INDUSTRIAL PHOTOGRAPHS

—Moni Hans Zielke and Franklin G. Beezley—*McGraw-Hill*, 113 p., illus., \$5.00. Generously illustrated with photographs, this book should be valuable to both professional and amateur photographer.

LIGNIN, CHEMISTRY AND UTILIZATION—*Northeastern Wood Utilization Council*, 135 p., paper, \$2.00. Report of conference at New Haven, Conn., Sept. 19, 1947.

MALAYSIA, CROSSROADS OF THE ORIENT—Fay-Cooper Cole—*Oregon State System of Higher Education*, 20 p., illus., paper, 75 cents. Anthropological background for an understanding of a part of the world of newly realized importance to us.

NEWER METHODS OF PREPARATIVE ORGANIC CHEMISTRY—*Interscience*, rev. ed., 657 p., \$8.50. A translation of the German *Neuere Methoden der präparativen organischen Chemie*, I.

PERENNIAL HARVEST—Philip Hillyer Smith—*Harper*, 272 p., illus., \$3.00. An account of the rebuilding of an old farm and incidentally of a life.

PSYCHOLOGY AND MILITARY PROFICIENCY: A History of the Applied Psychology Panel of the National Defense Research Committee—Charles W. Bray—*Princeton University Press*, 242 p., illus., \$3.50. Making public the results of important wartime research on the human element in warfare.

THE PSYCHOLOGY OF BEHAVIOR DISORDERS: A Bisocial Interpretation—Norman Cameron—*Houghton Mifflin*, 622 p., illus., \$5.00. The author sees neuroses and psychoses as a community and a national problem. A book of interest especially to physicians and psychologists.

A RUSSIAN JOURNAL—John Steinbeck with pictures by Robert Capa—*Viking*, 220 p., illus., \$3.75. Intended to portray the people of Russia. The numerous photographs are technically beautiful and tell an interesting story.

SMALL-FRUIT CULTURE: A Text for Instruction and a Guide for Field Practice—James Sheldon Shoemaker—*Blakiston*, 2d ed., 433 p., illus., \$4.00. A helpful book for the home gardener as well as the commercial fruit grower.

STARLINGS—Wilfred S. Bronson—*Harcourt, Brace*, illus., \$2.00. You will almost like the starling after reading this delightful book for children of all ages. The beautiful illustrations are by the author.

Science News Letter, May 1, 1948

Over-all length of the elephant shrew, including its seven-inch red-dotted tail, is about 17 inches. Its nose ends in a two-inch proboscis, searching and sensitive as an elephant's trunk. It has a kangaroo-like build, with short forelegs and disproportionately long hind legs.

Science News Letter, May 1, 1948

Science Service Radio

► LISTEN in to a discussion on Tropical Medicine and Malaria Today on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDST, Saturday, May 8. Dr. Arnaldo Gabaldon, Venezuelan delegate to the World Health Organization, and Dr. Lewis Hackett, an expert on malaria with the Rockefeller Foundation in Buenos Aires, will be the guests of Mr. Watson Davis, director of Science Service. They will discuss malaria and strange diseases, telling about the diagnosis and the new treatments for these diseases.

Science News Letter, May 1, 1948

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ZOOLOGY

Rare Elephant Shrews Are Captives in New York Zoo

► TWO elephant shrews, an extremely rare species never yet seen outside of its native Africa, have been captured for the New York Zoological Society by the Belgian Congo Expedition now in the field under the direction of Charles Cordier.

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 412. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **GARBAGE INCINERATOR** uses the waste itself as fuel. A unique down-draft system draws air from the top through the refuse which dries it as it burns, or even when not ignited. It is claimed to be a safe, sanitary, odorless way of burning all wet or dry garbage and other refuse.

Science News Letter, May 1, 1948

❁ **GLASS PARTITION** for office buildings reduces sound transmission as well as heat passage. A unit consists of two or more panes of glass separated by dry air sealed in by metal-to-glass bond. It can be used in ordinary windows to keep out street noises.

Science News Letter, May 1, 1948

❁ **LENSES** to magnify television pictures for the benefit of viewers is made of two sheets of a crystal-clear plastic bonded together to form a hollow cell which is filled with clear mineral oil. This light-weight lens is durable and withstands temperature changes without cracking.

Science News Letter, May 1, 1948

❁ **PENCIL SHARPENER**, for the desk or handbag, is in a plastic housing a little larger than a man's thumb, and can make a standard point, draftsman's long-lead blunt or long-lead sharp by regulating a cap at one end. A mere turn of this ball-bearing cap does the sharpening.

Science News Letter, May 1, 1948

❁ **X-RAY THERAPY** apparatus, shown



in the picture, is designed particularly for the treatment of skin ailments. It is claimed to produce, in comparison with other machines, an extremely high proportion of "soft" or long-wavelength radiation, which does not penetrate the surface.

Science News Letter, May 1, 1948

❁ **ELECTRONIC MICROAMMETER**, claimed to be capable of measuring accurately electrical direct current down to one-billionth of an ampere, is a portable, battery-operated, vacuum-tube meter useful in many fields where extremely small currents are involved. It is of especial value in television and atomic research.

Science News Letter, May 1, 1948

❁ **TRIANGULATOR**, one use of which is to aid an editor in selecting a portion of a photograph for reproduction, has two graduated arms at a right angle, and two sliding arms, to make a rectangle of any size desired, under which the picture is placed. When an attached wire is positioned diagonally, every composition within the rectangle is directly proportional to the rectangle.

Science News Letter, May 1, 1948

❁ **ENGLISH HAIRBRUSH**, that imparts perfumed fragrance to the hair while brushing it, contains a refillable bristle base which is detachable from its plastic handle for convenience in washing and cleaning. Behind the bristle base is a special pad which can be saturated with any perfume desired.

Science News Letter, May 1, 1948

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Question Box

ASTRONOMY

What data do scientists hope to get from the annular eclipse? p. 277.

What new developments account for the dawning of a new golden age of astronomy? p. 279.

CHEMISTRY

What advantages are claimed for the new synthetic varnish? p. 276.

What is the secret of making jellied gasoline? p. 274.

Photographs: Cover, George A. Smith, Quarryville, Pa.; p. 275, University of Wisconsin; p. 279, Michigan State College.

MEDICINE

What advantages has radioactive cobalt over radium in cancer treatment? p. 275.

What is the new blue baby disease? p. 275.

OPHTHALMOLOGY

How much light do eyes need for visual work? p. 286.

PHYSICS-PHYSIOLOGY

How does the new heat-measuring instrument work? p. 278.

What damage to bodily structure can result from high intensity sound? p. 274.

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